

3.6

Plantings in the Sustainable Landscape

Plant selection and placement around buildings can help us benefit from sunlight and airflow while minimizing negative impacts of those forces. Plants provide economical means of modifying microclimate and are an investment in future energy savings. They can complement design features of buildings that are intended to conserve energy or provide passive solar heating, daylighting, and natural ventilation. Carefully selected plantings can also reduce allergies in and around buildings, create vitally important wildlife habitat, minimize outdoor water requirements, provide natural erosion control, and even detoxify contaminated soils.

Opportunities

Opportunities for sustainable landscape plantings are greatest when a new facility is being built, but there are lots of opportunities at existing facilities as well. Consider plantings whenever sitework is being done (relocation of roadways, installation of new underground utilities, expansion of a facility, etc.) as well as when landscape maintenance contracts are being reviewed—there may be opportunities to reduce maintenance costs by implementing more responsible landscaping practices. Also consider plantings when special needs arise, such as erosion problems along streams.

Technical Information

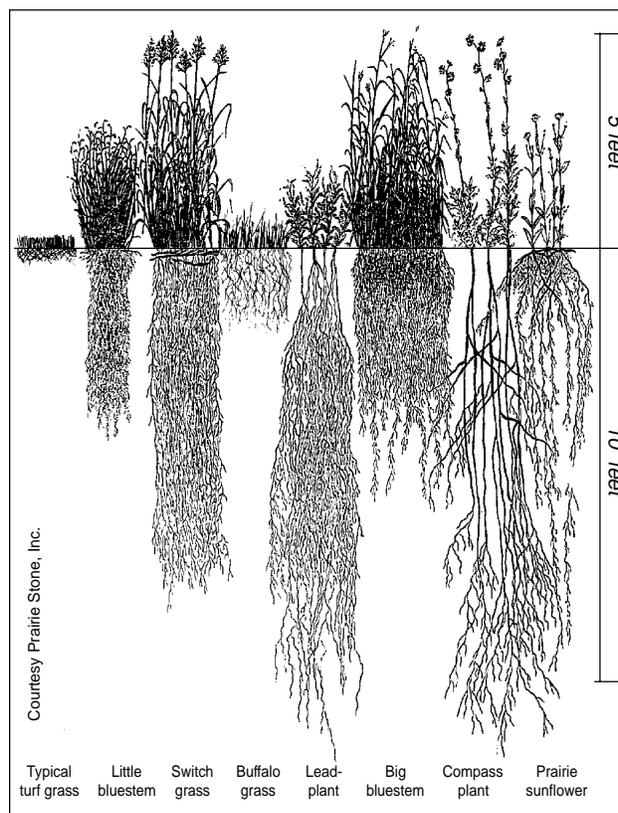
Trees are valuable assets for passively enhancing the interior comfort of small and medium-sized buildings, especially in warmer climates. When planning new facilities, try to protect existing trees on the site. Once established, most trees require little maintenance. Shade and air movement modification depend on height, growth rate, seasonal leaf persistence, canopy shape and density, seasonal solar angles, wind velocity, proximity, and height of structure. Generally, trunks of trees that grow to less than 40 feet (12 m) tall can be as close as 10 feet (3 m) from walls. Trees that grow over 40 feet (12 m) should be kept further from walls. To allow air movement, lower branches near buildings should be removed as the tree grows.

Use trees and other plantings to reduce cooling costs. Particularly with residential and small commercial buildings, carefully situated and selected trees, shrubs, annuals, and vines can provide access to the winter sun (for passive solar heating and daylighting) while shading the building from hot summer sun. Tall deciduous trees with few low branches are effective near south-facing windows. Lower vegetation, such as tall annuals and deciduous vines, is

appropriate for west- and east-facing windows, though trees can also be appropriate. Arbors and trellises over walkways and outdoor activity areas can provide attractive, functional shade. Plants also create cooler temperatures by evaporating water from their leaves and, depending on humidity, can lower outdoor air temperature several degrees. Plantings can cut air conditioning costs by 5–20%.

Shrubs can influence airflow. Evergreen shrubs planted closely together and somewhat near a building wall can create a “dead-air” space around a building that reduces heat loss in winter. In summer, these same shrubs can provide cooling by evaporation and by shading the walls from early-morning and late-afternoon sun. Maintain a 2-foot (0.6 m) clear-zone between shrubs and the building walls to allow for maintenance access and to reduce mildew on exterior surfaces and insect access to the building. Where operable windows allow natural ventilation, proper pruning of shrubs will not block airflows or views.

Avoid highly allergenic plants. Some trees, shrubs, and herbaceous plants produce pollen or volatile organic



The extensive root systems of native prairie plants are responsible for many of their advantages over conventional turf grass (far left).

chemicals that are highly allergenic. The worst offenders tend to be the male forms of *dioecious* trees and shrubs (those with separate male and female forms, such as live oak, silver maple, pecan, and pepper tree). Ironically, it is often only the males of these species that are planted in urban areas because the females produce fruits that require more cleanup. OPALS provides 1–10 allergy-risk rankings of more than 5,000 plant species (see *Allergy-Free Gardening* in the references).

Soils. Heavy soil fertilization should not be required for plants that are adapted to the local soils and microclimate. Pay attention to the organic matter in soil (humus), which can be improved by incorporating leaf litter, lawn clippings, and other organic mulches. Mulches around plants also help retain moisture and keep down weeds, obviating the need for herbicides. Chipping locally derived wood waste for mulch can be less expensive than the disposal of such waste and the purchase of mulch.

Invasiveness of plants varies by region. Because of their potential to invade and disrupt native plant communities and create other environmental burdens, nonnative plants should be carefully evaluated; if invasive, they should not be planted and should be removed if present. While some such plants are merely discouraged, others may be strictly prohibited. Contact the nearest agricultural extension office for details.

Weed management is best achieved by prevention and nonchemical means. Mulch will prevent most weed seeds in the soil from germinating. Some weed seeds can be kept out by ensuring that flowers or seed heads are removed before going to seed (thistles, for example). Hand weeding is less expensive, less dangerous to workers, less noisy, and healthier for the environment than chemical treatment. See *Section 3.8 – Chemical Use in the Landscape* for more on strategies for avoiding herbicides and pesticides.

Simple, flowing designs usually require less maintenance. When choosing and placing plants, anticipate their mature size and form. Try to plant groups of species (natural plant communities) that are typically found in your region. Instead of conventional turf, consider “islands” of natural plantings surrounded by meadows that are occasionally mowed—but left more natural than lawns.

Create wildlife habitat. Designing plantings that foster biodiversity should be a consideration for any facility. With the increasing loss of open space, providing wildlife habitat and wildlife corridors in the landscaping around buildings is increasingly important ecologically. Small pockets of songbird habitat and patches of tall-grass prairie around buildings are helping to stem the decline of many threatened animals—from birds to butterflies. Select diverse native vegetation, including plants that provide forage for birds. Also consider creating wetlands that can support amphibians, wading birds, fish, and diverse natural plant communities.

Xeriscaping is a specialized type of landscaping and plant selection for low water use. While xeriscaping strategies are most important in dry Southwestern climates, they can be important on certain soils and in certain microclimates in many parts of the country—especially areas prone to periodic droughts. Selecting plants that are native to a particular area and adapted to the specific site conditions generally ensures survival without irrigation. Look for nurseries and seed suppliers that specialize in native and xeriscape plantings.

Bioengineering is a relatively new specialty of landscaping in which plants are used for erosion control and other “engineering” functions. What civil engineers generally do with rip-rap-lined channels, wire-mesh shrouded gabions, and rock fill, skilled landscapers can often do with natural, biodegradable mats, fiber-rolls, and native plantings. Bioengineered plantings along streams and rivers will become more and more effective over time at protecting the banks from erosion, while the conventionally engineered alternative breaks down over time, becoming less effective.

References

Sauer, Leslie, *The Once and Future Forest: A Guide to Forest Restoration Strategies*, Island Press, Washington, DC, 1998.

Druse, Ken, and Margaret Roach, *The Natural Habitat Garden*, Clarkson N. Potter, Inc., New York, NY, 1994.

Ogren, Thomas, *Allergy-Free Gardening: The Revolutionary Guide to Healthy Landscaping*, Ten Speed Press, Berkeley, CA, 2000.

Sternberg, Guy, and Jim Wilson, *Landscaping with Native Trees*, Chapters Publishers, Ltd., Shelburne, VT, 1995.

Thompson, William, and Kim Sorvig, *Sustainable Landscape Construction: A Guide to Green Building Outdoors*, Island Press, Washington, DC, 2000.

Cooling our Communities: A Guidebook on Tree Planting and Light-Colored Surfaces, Environmental Protection Agency, Washington, DC, January 1992.

Shading and Landscaping for Energy Efficiency, Arizona Energy Office, Phoenix, AZ; (602) 280-1402.

Contacts

County agricultural extension offices can provide planting information for regionally appropriate plants.

WaterWiser: The Water Efficiency Clearinghouse at www.waterwiser.org.

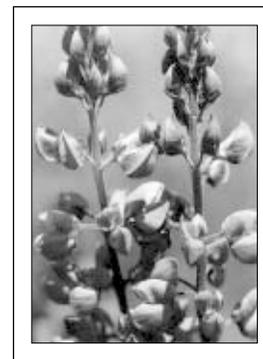


Photo: www.prairiefrontier.com

Varieties of hardy lupine can be used for displays of color in a landscape.